

Geological & Geophysical Data Acquisition

Outer Continental Shelf
Through 2004-2005

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Abbreviations

AVO	Amplitude Variation with Offset data
CDP	Common depth point seismic data
CFR	Code of Federal Regulations
COST	Continental Offshore Stratigraphic Test
CSEM	Controlled Source Electromagnetic survey
DOI	Department of the Interior
DST	Deep stratigraphic test (well)
FY	Fiscal Year
G&G	Geological and geophysical
GOM	Gulf of Mexico
GRAV	Gravity data
HRD	High-resolution seismic data
MAG	Magnetic data
MMS	Minerals Management Service
OBS	Ocean Bottom Seismometers
OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Lands Act
RE	Resource Evaluation
REP	Resource Evaluation Program
SEG	Society of Exploration Geophysicists
2-D	Two-dimensional seismic data
3-D	Three-dimensional seismic data
4-D	Four-dimensional seismic data

Introduction

This report addresses the general role of the Minerals Management Service (MMS) Resource Evaluation Program (REP) in geological and geophysical (G&G) data acquisition and permitting activities.

The MMS administers the provisions of the Outer Continental Shelf Lands Act (OCSLA) through regulations found at Title 30 of the Code of Federal Regulations (CFR). The regulations govern permitting, data acquisitions and release, leasing, and postlease operations on the Outer Continental Shelf (OCS). The OCS is divided into planning areas for administrative purposes as shown in figure 1.

With regard to the REP, authority has been vested in the Secretary of the Interior under 30 CFR Part 251 to regulate prelease G&G exploration for oil, gas, and sulphur resources on the OCS. Part 251 applies not only to G&G exploration but to scientific research as well. The purpose of these regulations is to prescribe (1) when a permit or the filing of a notice is required to conduct G&G activities on the OCS and (2) operating procedures for conducting exploration, as well as requirements for disclosing data and information, conditions for reimbursing permittees for certain costs, and other conditions under which exploration shall be conducted. Similar regulations addressing prelease prospecting activities for minerals other than oil, gas, or sulphur can be found in 30 CFR Part 280.

In this report, the totals for permits issued, mileage acquired, and expenditures reflect the overall trends of oil and gas pricing, limitations of areas due to offshore moratoria, and the shift of industry emphasis to foreign theatres. Also reflected is the trend among the MMS regions with diminished leasing activity to obtain digital tapes of in-house analog data for data release, which has commenced with the expiration of proprietary terms beginning in 2001 as discussed by Fulton (1998).

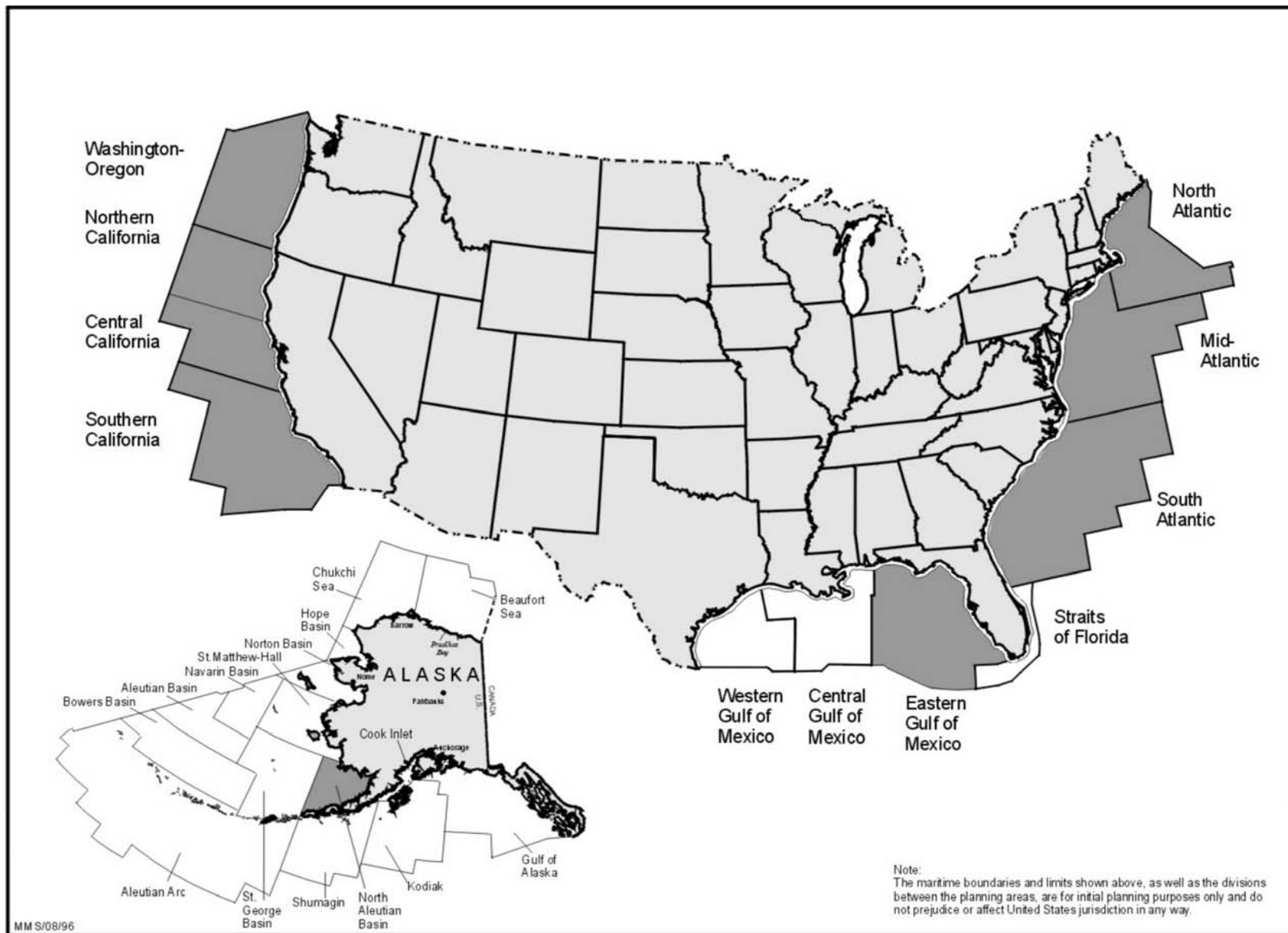


Figure 1. Federal Outer Continental Shelf Planning Areas

Deep Stratigraphic Tests

A deep stratigraphic test, as defined in 30 CFR 251, means, “drilling that involves the penetration into the sea bottom of more than 500 feet (152 meters).” These wells are known as Continental Offshore Stratigraphic Test (COST) wells and are drilled primarily to gather geological information. Conversely, shallow test drilling, as defined in the same regulations, means, “drilling into the sea bottom to depths less than those specified in the definition of a deep stratigraphic test.” Three COST wells have encountered hydrocarbons: the COST B-3 (Atlantic), Point Conception No.1 (California), and the Norton COST No. 2 (Alaska). The proprietary term for a COST well is 25 years or, if a lease sale is held in the area, 60 days after the issuance of a lease within 50 geographic miles of the test. A discussion of the cost well program is described by Dellagiarino (1991).

G&G Data Release

Regulations, promulgated in 1976, require all prelease G&G information be held proprietary for 25 years, and then be released to the public. Hence, the first data sets were released in 2001. These data sets are in southern Alaska, Southern California through Washington/Oregon, the North, Mid, and South Atlantic planning areas, and in Eastern, Central, and Western GOM areas. Notices on the availability of these data may be found at the Regional links to the MMS homepage at <http://www.mms.gov>.

Analysis of Present MMS Data Coverage on the OCS

Mileage/Blocks

A leading indicator of the amount of OCS oil and gas activity is the number and associated mileage of prelease exploration permits that the MMS issues to industry each year. Between 1968 and the early 1990's, industry has shot and recorded approximately 500,000 line miles of CDP data each year on the OCS. Of that data, the MMS has selected and acquired approximately 50,000 line miles of those CDP data each year for the REP.

Since the early 1990s, the MMS, as well as industry, has increased its acquisition of 3-D seismic data in concert with the development and use of interactive workstations. Table 1 shows the CDP (2-D) seismic data coverage, by region and planning area that the MMS has in its inventory. The grid coverage is not uniform over the planning areas. Tables 2, 3, and 4 summarize the MMS data acquisitions through 2003. It should be noted that 3-D seismic information in the MMS inventory is just about equal to the 2-D holdings in that 33,000 blocks of 3-D information equates to about 1.5 million miles of conventional seismic information.

The MMS has not acquired all of the permit data shot and recorded by industry because of budget restrictions on reimbursing the permittees for data reproduction and some processing; the lack of the necessary personnel to manage, interpret, and analyze this large volume of data, as well as the need for media storage capacity; and, primarily, the redundancy of data

shot on the OCS by different companies. However, in some areas in which the MMS has previously obtained 2-D or 3-D seismic information, it will acquire new information that is derived from data acquired more recently with state-of-the-art equipment and methods, such as AVO, or from previously acquired data that are reprocessed using more modern techniques.

The Regions formerly spent funds on prelease high-resolution data (HRD), as these data were acquired under exclusive contract rather than under permit. A change in policy in 1982 altered this situation. Under the previous program, the MMS directly acquired prelease, tract-specific, shallow hazards data. Under the areawide leasing program, the detailed shallow hazards analysis function was shifted to the postsale phase, and the responsibility for site-specific hazards data collection was placed on the lessee as a condition to obtain a drilling permit. If industry chooses to conduct prelease hazards surveys, G&G permits must be obtained from the MMS. Shallow hazards survey data and information are available to the MMS under terms of permit or lease and regulations. This practice has continued under the focused leasing approach adopted in 1984.

Geological and/or Geophysical Exploration Permits

As mentioned, the number of permits issued by the MMS and the areas for which the permits are issued are leading indicators of oil and gas activity on the OCS. Table 5 presents the statistics of G&G exploration permitting for the OCS since 1960, with a differentiation between geological permits and geophysical permits from 1969 to 2003.

The MMS tracks G&G permits by calendar year. (tables A-2, A-6, A-10, and A-14 show total permits per Region.) They demonstrate that most OCS oil and gas activity has been in the Gulf of Mexico. The GOM has issued 82 percent of all permits and is followed by the Alaska Region with 9 percent. The Pacific Region has issued 7 percent of the permits, followed by the now defunct Atlantic Region with about 2 percent. However, since 1994 activities in the Atlantic have been assigned to the GOM Region. With the addition of these responsibilities, the percentage of total permits for the GOM Region increases to 85 percent. These statistics correlate extremely well with the dominant position of the Central and Western GOM planning areas in OCS oil and gas activities.

It should be noted that since 1969, approximately 95 percent of the permits issued were for geophysical exploration and that geological exploration permits accounted for only 5 percent. While the total number of 3-D permits compared to all permits issued is rather small (8 percent) when compared with the total geophysical permits issued, over the past 10 years, 3-D permits have averaged 49 percent of all geophysical permits. Permits for deep stratigraphic test wells or COST wells account for about 2 percent of the geological permits.

The overall trends in permitting for all the Regions are similar and reflect fluctuations in the price and supply of petroleum. Some regional differences can be detected that are related to leasing moratoria, operating conditions, and hydrocarbon discoveries. Leasing moratoria and adverse weather conditions decrease exploration activity.

Expenditures

The MMS records financial and procurement transactions by fiscal year (FY). All figures and tables involving the MMS data acquisition from permittees are based on a fiscal year that begins on October 1 and extends through the following September 30.

Tables 6 and 7 show the total expenditures for G&G data since 1968 for those data presented in table 4. Tables 6 and 7 show the distribution of G&G expenditures by Region. The GOM and Alaska have the largest portion of the expenditures with 39 and 37 percent respectively. Alaska has over twice the offshore area of the other three Regions combined. On the other hand, the GOM, with over 95 percent of OCS production, possesses the largest database.

The Atlantic Region (13 percent of the expenditures) and the Pacific (10 percent) are comparable. The Pacific Region has the smallest slice of the expenditures for G&G data because much of the California OCS and offshore Washington and Oregon have been under moratoria since the 1980s. Much of the Atlantic Region is also under moratoria and there is no new seismic information being collected that MMS would acquire. The main difference between the two Regions, according to table 7 is in the acquisition of high-resolution data in the Atlantic.

The GOM Region's dominant role in establishing the offshore industry is apparent by its acquisition of the majority of the data before 1976 and more so since 1990. Between 1976 and 1989, a significant portion of the MMS geological and geophysical data acquisition budget has been expended by the Alaska Region, which oversees most of the OCS lands. However, since the 1990s and up through the present, most of the MMS geological and geophysical data acquisition budget has been allocated for data in the GOM.

There were large values for the average cost per mile for data in the Alaska Region from the late 1970s into the 1990s and for the Atlantic Region in the 1980s. The Alaska Region purchased a great deal of data shot in State waters, where a Federal permit is not applicable. Thus, the reimbursement did not fall under the provisions of the OCSLA, and the MMS was required to pay full market price for these data. The price varied from \$1,500 to \$6,000 per mile and is reflected in the unusually high average cost per mile shown in table 8.

The Atlantic Region contracted for several sets of exclusive high-resolution data that were used for sales and hazards studies. The high price of exclusive high-resolution data, some well over \$450 per mile, increased the average cost per mile in the Atlantic Region that year.

Overall, the early to mid-1980s saw a dramatic increase in expenditures by the MMS as more reprocessed data were acquired to address areawide leasing and a more aggressively proposed 5-year OCS leasing schedule. However, due to regulatory changes in reimbursement procedures in 1986, the cost per mile has dropped dramatically. With a less aggressive 5-Year Leasing Schedule and new exploration theatres worldwide, total expenditures have decreased from the 1980s to the present.